

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently amended) A semiconductor device comprising:

a semiconductor substrate;

a first insulating film formed over said semiconductor substrate;

a wiring opening formed in said first insulating film;

a wiring having a first conductive film containing copper as a primary component, and embedded in said wiring opening;

a first barrier insulating film formed over said wiring and said first insulating film;

a second barrier insulating film formed over said first barrier insulating film; and

a second insulating film formed on said second barrier insulating film and having a lower dielectric constant than that of an oxide silicon film,

wherein a barrier property of a material constituting said first barrier insulating film to copper is larger than

that of a material constituting said second barrier insulating film,—and

wherein the material constituting said second barrier insulating film has a greater adhesiveness than the material constituting said first barrier insulating film to a material constituting said second insulating film,

wherein the thickness of said first barrier insulating film is greater than that of said second barrier insulating film,

wherein the thickness of said first barrier insulating film is 40 nm or less, and

wherein the thickness of said second barrier insulating film is 10 nm or less.

Claims 2-3 (Cancelled).

4. (Original) The semiconductor device according to claim 1,

wherein said second insulating film is a film formed by a coating or CVD method.

5. (Original) The semiconductor device according to claim 1,

wherein said wiring has a barrier conductive film formed on a bottom surface and a side surface of said wiring opening, and said first conductive film formed over said barrier conductive film.

6. (Original) The semiconductor device according to claim 1,

wherein said first barrier insulating film is made of a material containing silicon and carbon and at least one of nitrogen and oxygen.

7. (Original) The semiconductor device according to claim 1,

wherein said second barrier insulating film is made of silicon carbide.

8. (Original) The semiconductor device according to claim 1,

wherein said second insulating film is made of a material containing silicon, oxygen, and carbon.

9. (Original) The semiconductor device according to claim 1,

wherein a copper compound film whose diffusion coefficient is smaller than that of copper or a metal film made of metal other than copper is formed over a surface of said wiring.

10. (Original) The semiconductor device according to claim 1,

wherein a surface of said wiring is nitrided.

11. (Original) The semiconductor device according to claim 1,

wherein a third insulating film is formed between said first insulating film and said first barrier insulating film.

12. (Original) The semiconductor device according to claim 11,

wherein a fourth insulating film is formed between said first and third insulating films.

13. (Currently amended) A semiconductor device comprising:

a semiconductor substrate;

a first insulating film formed over said semiconductor substrate;

a wiring opening formed in said first insulating film;

a wiring having a first conductive film containing copper as a primary component, and embedded in said wiring opening;

a second insulating film formed over said wiring and said first insulating film, and made of a material including silicon and carbon and at least one of nitrogen and oxygen;

a third insulating film made of silicon carbide and formed over said second insulating film; and

a fourth insulating film formed over said third insulating film, and having a lower dielectric constant than that of an oxide silicon film,

wherein a barrier property of a material constituting said second insulating film to copper is larger than that of a material constituting said third insulating film,—and

wherein the material constituting said third insulating film has a greater adhesiveness than the material constituting said second insulating film to a material constituting said fourth insulating film,

wherein the thickness of said second insulating film is greater than that of said third insulating film,

wherein the thickness of said second insulating film is
40 nm or less, and

wherein the thickness of said third insulating film is
10 nm or less.

14. (Original) The semiconductor device according to
claim 13,

wherein said fourth insulating film is made of a
material containing silicon, oxygen, and carbon.

Claims 15-16 (Cancelled).

17. (Currently amended) A semiconductor device
comprising:

a semiconductor substrate;

a first insulating film formed over said semiconductor
substrate;

a wiring opening formed in said first insulating film;

a wiring having a first conductive film containing
copper as a primary component, and embedded in said wiring
opening;

a second insulating film formed over said wiring and
said first insulating film, and restraining or preventing
diffusion of copper;

a third insulating film formed over said second insulating film, and controlling a stress; and
a fourth insulating film formed over said third insulating film, and having a lower dielectric constant than that of an oxide silicon film,

wherein a stress of a laminated film of said second and third insulating films is -180 MPa or more,

wherein a barrier property of a material constituting said second insulating film to copper is larger than that of the material constituting said third insulating film,~~and~~

wherein an adhesiveness of the material constituting said third insulating film has a greater adhesiveness than the material constituting said second insulating film to a material constituting said fourth insulating film,

wherein the thickness of said second insulating film is greater than that of said third insulating film,

wherein the thickness of said second insulating film is 40 nm or less, and

wherein the thickness of said third insulating film is 10 nm or less.

18. (Previously Presented) The semiconductor device according to claim 17,

wherein said third insulating film relaxes stress generated by said second insulating film.

19. (Previously Presented) The semiconductor device according to claim 17,

wherein said second insulating film generates a compression stress, and said third insulating film generates a tensile stress.

20. (Original) The semiconductor device according to claim 17,

wherein said second insulating film is made of a material containing silicon, carbon, and nitrogen.

21. (Original) The semiconductor device according to claim 17,

wherein said third insulating film is made of silicon carbide.

Claims 22-41 (Cancelled).

42. (New) The semiconductor device according to claim
13,

wherein said fourth insulating film is a film formed by
a coating or CVD method.

43. (New) The semiconductor device according to claim
13,

wherein said wiring has a barrier conductive film
formed on a bottom surface and a side surface of said wiring
opening, and said first conductive film formed over said
barrier conductive film.

44. (New) The semiconductor device according to claim
13,

wherein said fourth insulating film is made of a
material containing silicon, oxygen, and carbon.

45. (New) The semiconductor device according to claim
13,

wherein a copper compound film whose diffusion
coefficient is smaller than that of copper or a metal film
made of metal other than copper is formed over a surface of
said wiring.

46. (New) The semiconductor device according to claim
13,

wherein a surface of said wiring is nitrided.

47. (New) The semiconductor device according to claim
13,

wherein a fifth insulating film is formed between said
first insulating film and said second insulating film.

48. (New) The semiconductor device according to claim
47,

wherein a sixth insulating film is formed between said
first insulating film and said fifth insulating film.